


Date: Wednesday, 4/4/2007 8:59:09 AM
 User: Kim Johnston

Process Sheet

Customer : CU-DAR001 Dart Helicopters Services	Drawing Name : X-TUBE 412	
Job Number : 31597	Part Number : D412664245	
Estimate Number : 12727	Drawing Number : D412-664-245 U/R	
P.O. Number : <i>N/A</i>	Project Number : N/A	
This Issue : 4/4/2007 S.O. No. : <i>N/A</i>	Drawing Revision : U/R	
Prsht Rev. : NC	Material : <i>N/A</i>	
First Issue : <i>N/A</i> Type : LANDING GEAR	Due Date : 4/30/2007	Qty: 1 Um: Each
Previous Run : 31437		
Written By : <i>[Signature]</i>		
Checked & Approved By : <i>[Signature]</i>		
Comment : Est Rev <i>A</i> New Issue 07-02-14 JLM		

Additional Product

Job Number:



Seq. #:

Machine Or Operation:

Description :

1.0

D6009129

Crosstube Material



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube *B 29611*

Check OD = 3.500"; ID = 2.250"

S.F. 07/04/13

2.0

DC

DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile & type labels per PPPD412-664-205

CHG001 *N/A*

3.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

Turn as per Dwg D412-664-245

S.F. 07/04/13

4.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

S.F. 07/04/13

5.0

QC8

SECOND CHECK



Comment: SECOND CHECK

S.F. 07/04/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/4/2007 8:59:10 AM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31597

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description:

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

JD 2-4-18

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 2-4-18

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

JD 2-4-18

9.0

QC3/5

INSPECT WORK/WING WALK



Comment: Inspect work & Chemical conversion Coat

DP 2-5-1

10.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

EL 2-5-1

11.0

QC6

DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

207051110

12.0

D36061

CUFF



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

CUFF

Batch: B31474

DP 2-6-6

13.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Rivet holes as per Dwg D412-664-245

2-Drill pilot holes in tube as per Dwg D412-664-245

3-Ream hole to finish size in tube as per Dwg D412-664-245

DP 2-6-4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

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User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31597

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description:

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

50 7-5-14

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI.005 4.1

50 7-5-14

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 3781 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

6/20/05/15 ①

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

6/7/05/16 ①

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

20.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D412-6647-245. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: M103561

DP 7-6-4

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES						
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector	
070605	21.1	QC 5, add. Perm change						
		QC 5	J	070605	①	070605	070605	

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

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Date: Wednesday, 4/4/2007 8:59:10 AM

User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31597

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

27.0

D2856600

Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total : 0.9450 f(s)

Abrasion Strip

2 X D2856-600-1009

Batch:

26650

RT 07-06-07

28.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28

Clamp

102534

RT 07-06-07

29.0

MS2192028

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch:

102534 100154

RT 07-06-07

30.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-245

Install Chaffing Shields

Instal support with magnobond 6398 per dwg D412-664-245,
cure for 12hrs before packaging.

Time & date of application:

500 07-06-07

Batch:

103628

RT
07-06-07

31.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

32.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-205

PPP 32180

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: 12 Date: 07/06/08
 QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 4/4/2007 8:59:10 AM
User: Kim Johnston

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 31597

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date

Time & date of packaging: 07/06/08 12:30

Location: _____

PPP Rev: _____

B 31597

POSITIVE RECALL

EFFECTIVE 07.04.04 AUTH JP

RELEASED JA DATE 07/08/06

33.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

07/06/08

Job Completion



JA 07.06.08

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries



DESIGN <i>GP</i>	DRAWN BY <i>GP</i>	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D412-664-245	REV. B SHEET 1 OF 3
DATE 07.03.01		TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS	
A	06.12.01	NEW ISSUE	
B	07.03.01	CHG CUFF AREA, CHG RUBBER CUSHION	

PRELIMINARY ISSUE

PARTS LIST:

Qty	Part Number	Description
X	D412-664-245	CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT)
1	D6009-129	CROSSTUBE
2	D2856-600-1009	ABRASION STRIP
1	D2896-1	SUPPORT
2	D3189-1	CHAFING SHIELD
2	D3595-063-580	RUBBER CUSHION
2	D3606-1	CUFF
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
4	MS21920-28	CLAMP
2	MS21920-32	CLAMP
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-32 CLAMPS WITH D3595-063-580 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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WITH AT TO AMENDMENT
WITHOUT NOTICE

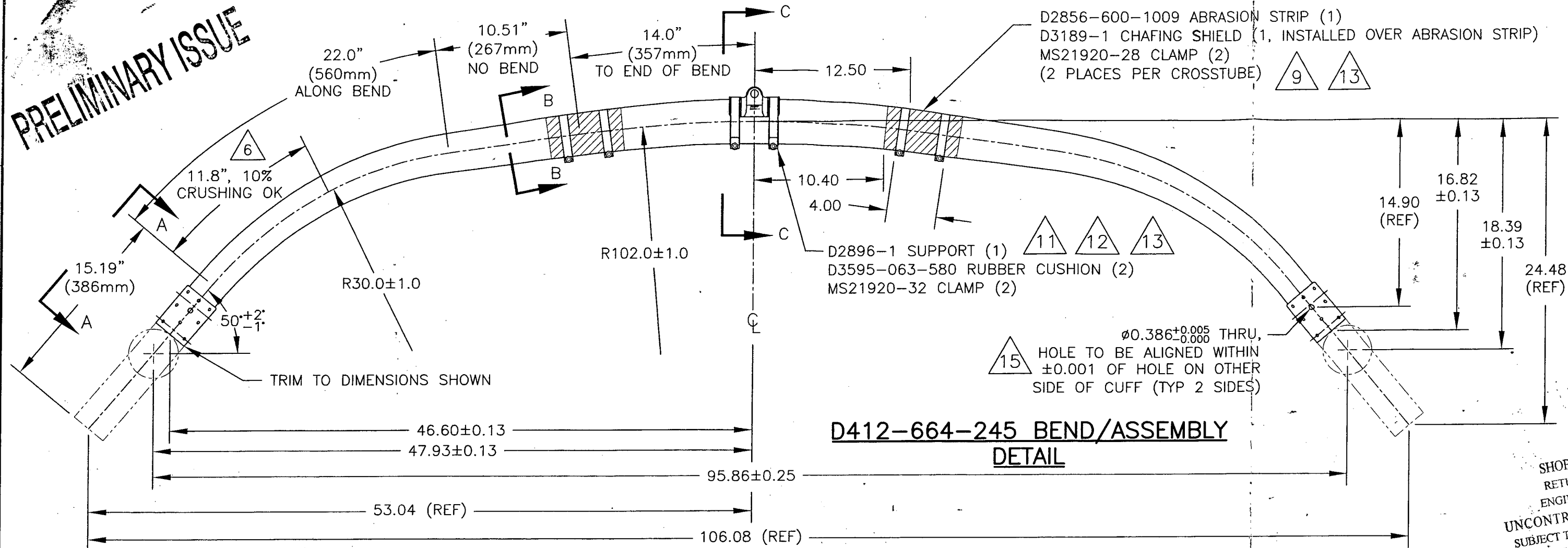
WORK ORDER

NO. 31597

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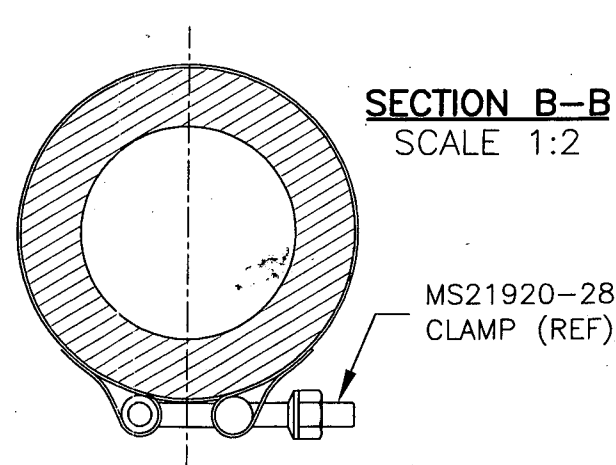
PRELIMINARY ISSUE



**D412-664-245 BEND/ASSEMBLY
DETAIL**

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WORK ORDER
31597

**SECTION C-C
SCALE 1:2 NO. 31597**



APPLY MAGNOBOND
BETWEEN D2896-1 AND
THE CROSSTUBE

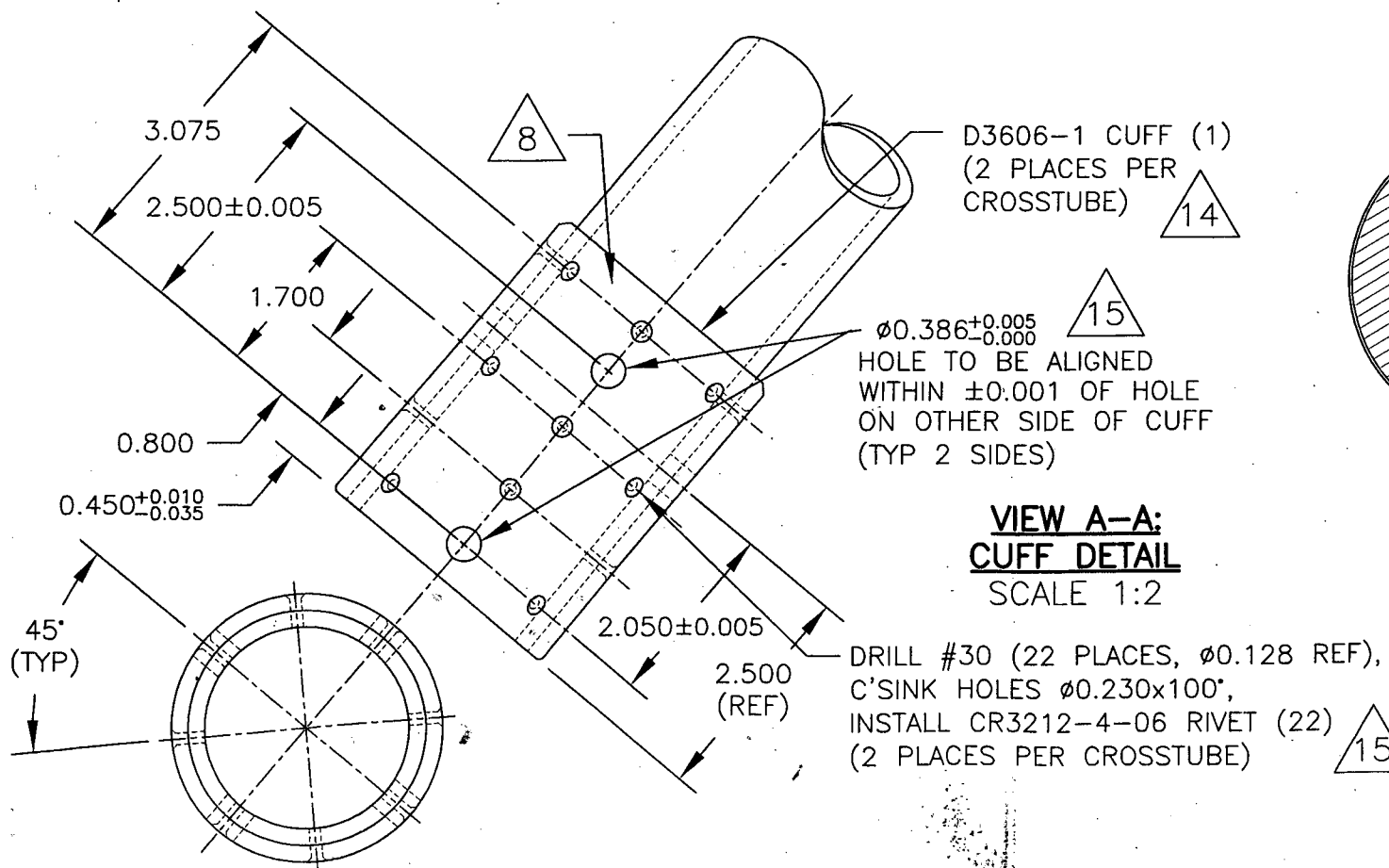
11

D2896-1
SUPPORT
(REF)

D3595-063-580
RUBBER CUSHION
(UNDER CLAMP, REF)

MS21920-32
CLAMP (REF)

13

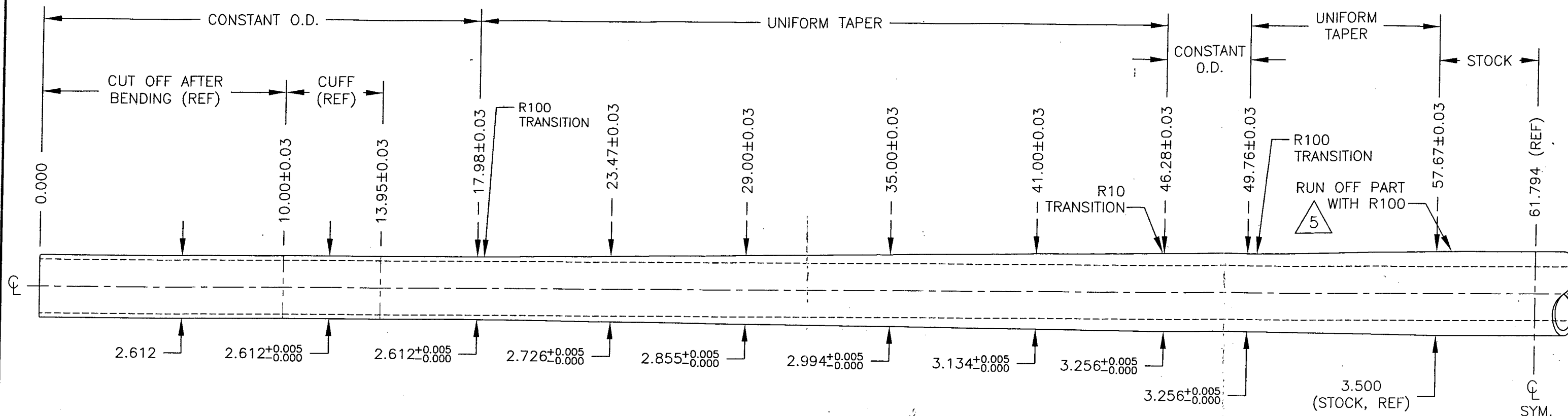


**VIEW A-A:
CUFF DETAIL
SCALE 1:2**

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DESIGN	q	DRAWN BY	q	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
CHECKED	h	APPROVED	h	DRAWING NO.	REV. B
DATE	07.03.01			D412-664-245	SHEET 2 OF 3
				TITLE	SCALE
				CROSSTUBE (412 LOW-NARROW AFT)	1:8



D412-664-245 MACHINING DETAIL

PRELIMINARY ISSUE

123 580

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WORK ORDER
NO. 31597

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DATE 07.03.01		TITLE CROSSTUBE (412 LOW-NARROW AFT)		SCALE 1:4	

DART AEROSPACE LTD		Work Order: 31597
Description: H12 X-Tube		Part Number: 412664 245
Inspection Dwg: 412664 245 Rev: B		Page 1 of 1

FIRST ARTICLE INSPECTION CHECKLIST

☒

First Article

☐

Prototype

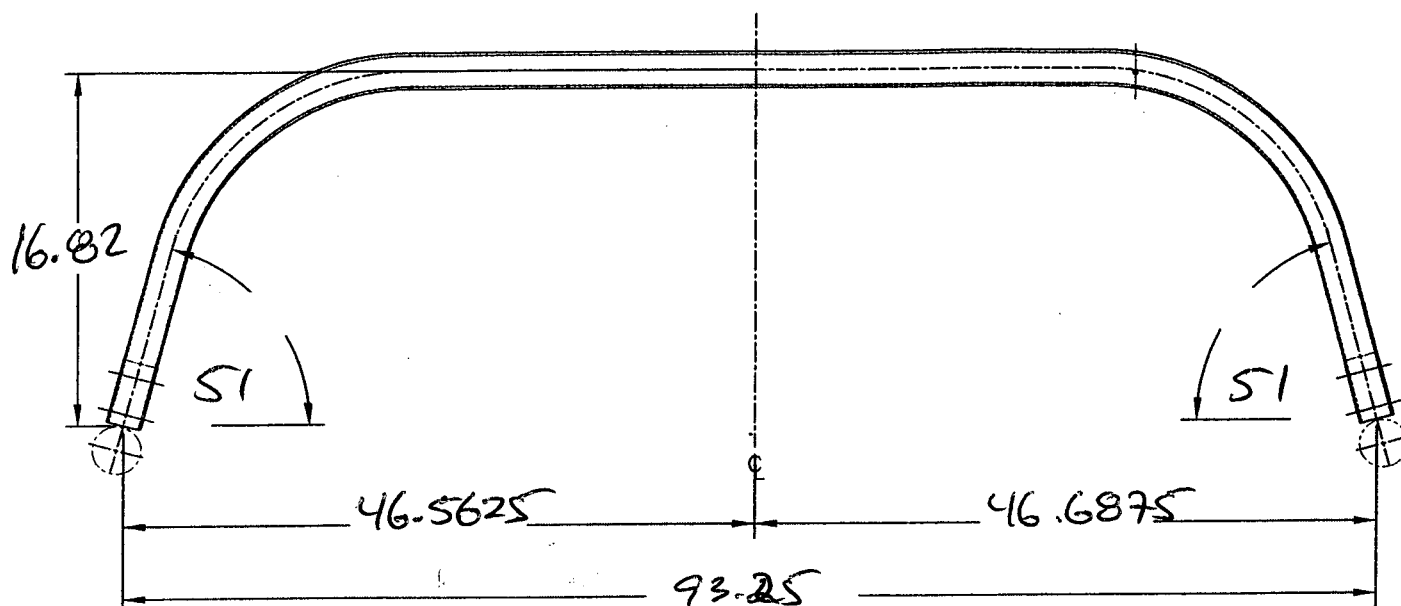
Drawing Dimension	Tolerance	Actual Dimension	Accept	Reject	Method of Inspection	Comments
2.612	+0.005 -0.000	2.615	✓			
2.612	"	2.617	✓			
2.726	"	2.730	✓			
2.855	"	2.859	✓			
2.994	"	2.998	✓			
3.134	"	3.138	✓			
3.256	"	3.260	✓			
3.256	"	3.260	✓			
2.612	+0.005 -0.000	2.615	✓			
2.612	"	2.617	✓			
2.726	"	2.730	✓			
2.855	"	2.859	✓			
2.994	"	2.998	✓			
3.134	"	3.138	✓			
3.256	"	3.260	✓			
3.256	"	3.260	✓			
123.588	±0.030	123.588	✓			

Measured by: <i>[Signature]</i>	Audited by: <i>[Signature]</i>	Prototype Approval:
Date: 07/04/17	Date: 07/04/17	Date:

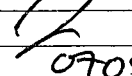
Rev	Date	Change	Revised by	Approved
A		New Issue	KJ/JLM	

DART AEROSPACE LTD		Work Order:	31597
Description: Crosstube Low Narrow Aft (412)		Part Number:	D412-664-205
Inspection Dwg: D412-664-245 Rev: C		Page 1 of 1	

Required Dimension	Min	Max
Height	16.69	16.95
1/2 Span	46.47	46.73
Angle	49°	52°
Total Span	92.94	93.46



Comments

QC15 Inspection	 070514
Date	

Rev	Date	Change	Revised by	Approved
A	07.04.27	New Issue	KJ/JM	

**HeathAir**

INTERNATIONAL (1991) INC.

681 Ave. Lapine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. N° 36413

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT**AIRCRAFT / COMPONENT INFORMATION**

REGISTRATION:

MODEL/TYPE:

SERIAL NUMBER:

TOTAL HR/LDG:

OPERATED BY:

BASED AT:

INSPECTION REQUIREMENTS

Carry out FPI of (4) cross tubes (external surface) as per ASTM E-1417-05 and the Dart QSI 038, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

Qty (1) P/N D407-667-205 S/N B31039
Qty (1) P/N D412-664-145 S/N B31601
Qty (2) P/N D412-664-245 S/N B31599 and B31597.

☐ RADIOGRAPHY☐ ULTRASONIC☒ PENETRANT☐ MAGNETIC PARTICLE☐ EDDY CURRENT**INSPECTION REPORT**

Fluorescent penetrant inspection was performed in accordance with the above requirements on (4) Cross Tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)
Ardrox 970P25E Batch #04B503.

(4) cross tubes inspected. (4) PASSED inspection / (0) FAILED inspection.

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

INSPECTED BY:

DATE

May 15, 2007

INSPECTION
STAMP(S)**CUSTOMER INFORMATION**

CUSTOMER: Dart Aerospace

ADDRESS: Fax. 613-632-1053

P.O. NUMBER

3781

CONTACT NAME:

Linda

LABOUR

MATERIALS

TRAVEL EXPENSES

HOTEL EXPENSES

\$

GST

PST

INVOICE NO.

TOTAL \$

WHITE COPY - INSPECTION FILE • YELLOW COPY - CUSTOMER • PINK COPY - ACCOUNTANT

